



REMARKS

Claims 6-11 and 13-25 are currently pending in the application. By this amendment, claims 7, 17 and 19 are amended for the Examiner's consideration. Claims 23-25 are added for the Examiner's consideration. Support for the amended and added claims is provided at least in Figure 5 and page 14 of the specification. No new matter is added. Reconsideration of the rejected claims in view of the above amendments and the following remarks is respectfully requested.

§112, 2nd Paragraph, Rejection

Claims 7, 10, 19 and 20-22 were rejected under 35 U.S.C. §112, 2nd paragraph. Claim 7 is amended to indicate that the reaction pawl is the same reaction pawl of claim 6; whereas, claim 6 recites the "molding". Claim 17 is amended to recite that the sprue is disposed in the union hole as the bottom portion of the cylinder to inject molten metal into the cavity. This finds support at page 13 of the present specification. Claim 19 is amended to provide proper antecedent basis to "the casting".

In view of the above, Applicants now request withdrawal of the §112, 2nd paragraph, rejection.

Prior Art Rejections

Claims 6, 9, 13-17 and 19 were rejected under 35 U.S.C. §103(a) over JP8-35530 in view of USPN 4,705,093 to Ogino. Claims 7, 8, 10 and 11 were rejected under §103(a) over JP8-35530 in view of Ogino and JP-1146718. Claim 18 was rejected under §103(a) over JP8-35530 in view of Ogino and WIPO 98/27353. Claims 20-22 were rejected under §103(a) over JP-835530, Ogino, JP-1146718 and WIPO 98/27353. These rejections are specifically set forth on pages 3-7 of the present office action.

Applicants respectfully traverse these rejections. Applicants further request withdrawal of the above rejections for the following reasons.

Discussion of Invention

The present invention is directed to a caliper body of vehicular disc brakes using a casting method. In embodiments, a union hole is formed at the bottom portion of the cylinder of the caliper body as a sprue for molding the caliper body with a base material. The caliper body is cast by having a cavity with the side of molding the bottom portion of the cylinder disposed in the upper part of and in the vertical direction of the cavity and with the side of molding the reaction pawl disposed in the lower part of and in the vertical direction thereof. The caliper body is molded with a cavity disposed with the union hole. By molding the caliper body in the manner described, a stable quantity of base material without sink marks and with sufficient rigidity is provided, and solidification can be easily managed. (See page 14.)

Additionally, after extensive experimentation, the inventors found that the specific ratios of material eliminate sink marks in the caliper body, itself. (See, pages 17-21.) The ratios ensure that the solidification starts from the reaction portion where the molten metal first enters after the injection of the molten material. The solidification then progresses toward the central portion where the solidification is slower, i.e., directional solidification. Although the volume of the reaction portion is reduced due to the solidification, the supply of the molten material from the central portion where the solidification is slow can be continued due to the step by step supply effect based on the ratio of volume. This also contributes to the elimination or prevention of any sink marks produced in the reaction portion. Sink marks are also eliminated in the caliper body. The method of the present invention also provides for molding of the base material in symmetry with respect to the sprue. In this manner, by not relying on a feeding head from a gate, no sink marks are produced even in a complicated structure of the present invention with great differences in wall thickness. Thus, the yield rate is improved and rigidity is sufficiently secured which results in an improved quality caliper body. (See, page 5.)

*Rejection of Claims
6, 9, 13-17 and 19*

In rejecting claims 6, 9, 13-17 and 19, the Examiner asserted that it would have been obvious to combine JP8-35530 with Ogino to achieve the claimed invention. Specifically, the Examiner asserted that JP8-35530 shows all of the features of the disc brake, but does not show the specific casting method of the present invention. The Examiner uses Ogino to show a gravity method of molding. Applicants submit that the combination of these references do not show all of the features of the claimed invention. Applicants further submit that there would be no reasonable expectation of success using the combination presented by the Examiner, and that one of ordinary skill in the art would not have been motivated to combine these references in order to achieve the claimed invention. For these reasons, Applicants submit that the Examiner has not provided a prima facie case of obviousness.

As may already be recognized, a caliper body of the present invention is utilized in disc brake systems. It is thus necessary that both the reaction pawl and the cylinder have a rigidity that can resist against a hydraulic pressure because such hydraulic pressure for operating the brake system is generated inside of the cylinder. Further, the reaction pawl must have a rigidity that can press a friction pad disposed on the reaction pawl side towards a disc rotor with its reaction force corresponding to an operating force of the cylinder side.

Applicants submit that JP 8-35530 shows important differences which, in combination with Ogino, would not result in the claimed invention. In particular, JP8-35530 discloses a brake caliper made from two materials (a) and (b). The brake caliper is equipped with a cylinder 2 and a yoke 1 which are made of light metal based composite material (a) with reinforcing components dispersed in the light metal materials. Light metal matrix parts, denoted as (b), are formed in a strip in the axial direction and are dividedly in the circumferential direction. Also, the seal 3, bottom part 4 and the inlet 5 are formed from the light metal matrix (b). Figures 2 and 3 shows the specific areas of the light metal matrix (b) and the light metal based composite material (a). The components 3, 4 and 5 are inserted into a cavity for die casting and then die cast

with material (a). Accordingly, these components 3, 4 and 5 are never fittingly inserted (press fitted).

Additionally, Applicants submit that there is no suggestion that the inlet 5 of JP8-35530 is used as a sprue for injecting molten material into a cavity for forming the brake. This would be pure conjecture on the part of the Examiner and Applicants submit impermissible hindsight reasoning. JP8-35530 only discloses and suggests that the inlet 5 is used for working fluid for the caliper, itself. (See, abstract.) Applicant further argues that since there is no suggestion that the inlet 5 is used as a sprue, it then follows that, for example, JP 8-35530 does not show or even remotely suggest that

the caliper body is molded while the side of molding said bottom portion of said cylinder is disposed in a vertically upper part of said cavity and also the side of molding said reaction pawl is disposed in a vertically lower part of said cavity.

Applicants further submit that the advantages achieved by JP8-35530 are provided by the use of different materials (a) and (b). It is the use of these materials in which a cutting performance and abrasion resistance with high rigidity is achieved. It is not through the same molding characteristics of the present invention. In fact, it is suggested that the use of the different materials (a) and (b) would teach away from using the inlet as a sprue simply because the sprue is made from material (b) as with other sections, while other portions are made with material (a). The use of the opening as the sprue cannot be used for such a configuration. Instead, a different type of casting method would be used, as previously discussed, which may not result in the high yield of the present invention, elimination of sink marks and the high rigidity.

Also, Applicants submit that it is highly improbable that gravity molding can be used to form the features of JP8-35530, much less achieve the claimed invention with a combination of Ogino and JP8-35530. Specifically, Applicants contend that a gravity casting method would not be able to form interspersed materials (a) and (b) (see Figures 2 and 3 of JP8-35530), in addition

to the material (b) for the seal 3, bottom part 4 and inlet 5. That is, one of ordinary skill in the art would not be able to use a gravity casting method to form all of the features of JP8-35530. Instead, it would appear that the JP8-35530 would use a high pressure or press fit method in order to form the different components of at least the seal 3, bottom part 4 and the inlet 5 of the light metal matrix (b). Of course, then, the combination of JP8-35530 and Ogino would not result in the claimed invention. Simply, the gravity casting method used with JP8-35530 would not result in a caliper body having a uniform base material as a whole; instead, if used, *arguendo*, it would result in a caliper body with the interspersed materials (a) and (b) and material (b) in the seal 3, bottom part 4 and the inlet 5.

There is also no suggestion in JP8-35530 that a flange portion of the union hole is formed by processing the sprue after the casting. Further, in the present invention, the molten metal is casted/supplied to a reaction side (awl side) from the cylinder side opposite to the reaction side while the cylinder side is positioned upside in the vertical direction, in such a manner that the molten metal can be easily flown. Accordingly, the directivity of the molten metal can be made very clear. On the other hand, this same feature cannot be provided with the configuration of JP8-35530 since there is the use of many different materials and in different areas of the casting.

For these reasons, it is submitted the Examiner has failed to prove a prima facie case of obviousness. Simply, there is no suggestion or motivation to modify or combine the references in order to obtain the claimed invention. This is based on: (i) JP8-35530 teaching the use of different materials in specific areas of the casting, (ii) there can be no reasonable expectation of success using the combination as presented by the Examiner and (iii) all of the features of the claimed invention would not result from combining the references as suggested by the Examiner.

*Rejection of Claims
7, 8, 10 and 11*

In the rejection of claims 7, 8, 10, and 11, the Examiner again maintains that JP-H1-146718 teaches the use of an optimal volume ratio to achieve little to no sink marks. Applicants again submit that although JP-H1-146718 discusses optimal volumes, there is no teaching

whatsoever concerning the specific parameters as recited in claims 7 and 8. These parameters, after exhaustive testing, were proven to eliminate sink marks as discussed at pages 20 and 21, for example, of the present specification. In addition, the ratios ensure that the solidification starts from the reaction portion where the molten metal first enters after the injection of the molten material, and then progresses toward the central portion where the solidification is slower, i.e., directional solidification.

JP-H1-146718, on the other hand, is directed to storing data on compression pressure and variations of volume due to cooling temperature on a storage medium. In fact, this reference only appears to directly disclose the volume ratio of a molding opening, and not the use of different ratios as compiled and recited by the claimed invention. Accordingly, Applicants would request that the Examiner provide a reference that definitively shows the features of the claimed invention in order to provide a prima facie case of obviousness.

Rejection of Claim 18

Claim 18 depends from distinguishable base claim 6. Claim 18 thus includes the features of claim 18 and should also be in condition for allowance for the same reasons set forth above.

Additionally, the WIPO reference (Weiler) discloses the use of a core, but there is no suggestion that a base material is injected in symmetry about the core. This reference only discloses that core print is provided near the opening 17 of the caliper bridge 2, which ensures that the core is in the correct position for the casting operation. (See related USPN 6,298,954 at col. 4, lines 14-16.)

Rejection of Claims 20-22

Applicants disagree with the Examiner's argument as it relates to claims 20-22. In this argument, the Examiner is of the opinion that the symmetry of the mold and the running of the based material towards the bridge and the reaction pawl would be provided by the core of Weiler. The Weiler reference is only used to generally support the use of a core, but does not

teach the specific placement thereof and hence there is no suggestion of the features argued by the Examiner.

The Examiner again neglects to even consider all of the elements of claim 22. For example, the Examiner does not even address the features of

... the solidification of the base material progresses toward said thick walled portion where the solidification is slower such that even though the volume of said reaction pawl is reduced because of the solidification, a supply of the base material from said thick walled portion continues due to a supply effect based on the ratio of volume, whereby any sink mark is prevented from being produced in the reaction pawl.

In any event, Applicants submit that these features are not taught or suggested by the combination of references.

Added Claims

Applicants further add claims 23-25 for the Examiner's consideration. Each of these added claims depend from a distinguishable base claim, respectively. Applicants submit that the features of claims 23-25 are also allowable.

Conclusion

In view of the foregoing amendments and remarks, Applicants submit that all of the claims are patentably distinct from the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue. The Examiner is invited to contact the undersigned at the telephone number listed below, if needed. Applicants hereby make a written conditional petition for extension of time, if required.

Serial No.: 09/695,874

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Please charge any deficiencies and credit any overpayment of fees to Attorney's Deposit
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Respectfully submitted,

A handwritten signature in black ink, appearing to be 'Andrew M. Calderon', with a stylized flourish at the end.

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